06-22-09

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF HAWAII

---- In the Matter of ----	)	
	)	
PUBLIC UTILITIES COMMISSION	)	DOCKET NO. 2008-0303
	)	
HAWAIIAN ELECTRIC COMPANY, INC.	)	
HAWAII ELECTRIC LIGHT COMPANY, INC.	)	
MAUI ELECTRIC COMPANY, LIMITED	)	
For Approval of the Advanced Metering	)	
Infrastructure (AMI) Project and Request	)	
To Commit Capital Funds, to Defer and	)	
Amortize Software Development Costs,	)	
To Begin Installation of Meters and	)	
Implement Time-of-Use Rates, for	)	
Approval of Accounting and Ratemaking	)	
Treatment, and Other Matters	)	

TESTIMONY (HREA-T-1) OF WARREN S. BOLLMEIER II

ON BEHALF OF THE HAWAII RENEWABLE ENERGY ALLIANCE

RE: APPROVAL OF THE AMI PROJECT AND REQUEST TO

COMMIT CAPITAL FUNDS, TO DEFER AND AMORTIZE SOFTWARE DEVELOPMENT,

TO BEGIN INSTALLATION OF METERS AND IMPLEMENT TIME-OF-USE RATES, FOR

APPROVAL OF ACCOUNTING AND RATEMAKING TREATMENT, AND OTHER MATTERS

AND

CERTIFICATE OF SERVICE

Warren S. Bollmeier II, President
Hawaii Renewable Energy Alliance
46-040 Konane Place #3816
Kaneohe HI 96744
Phone: (808) 247-7753
Email: wsb@lava.net

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Treatment, and Other Matters	)	
	)	

SECTION I -- INTRODUCTION

Q PLEASE STATE YOUR NAME, OCCUPATION AND BUSINESS ADDRESS.

A Warren S. Bollmeier II. I am an independent consultant, DBA WSB-Hawaii, in the fields of renewable energy, energy policy, integrated resource planning and public utility regulation. My office is located at 46-040 Konane Place, #3816, Kaneohe, HI.

Q PLEASE DESCRIBE YOUR EXPERIENCE AND EDUCATIONAL BACKGROUND

A I have worked since 1977 in research and development of renewable technologies on the mainland and in Hawaii since 1990, including development of windfarm projects, energy policy, and public utility integrated resource planning and regulatory matters. I have degrees in engineering from the University of Texas and the Air Force Institute of Technology, and an MBA from Georgia State University. More details are given in Exhibit No. HREA-A.

Q ON WHOSE BEHALF ARE YOU APPEARING IN THIS DOCKET?

A I am appearing on behalf of the Hawaii Renewable Energy Alliance ("HREA").

Q WHAT IS THE SUBJECT OF THIS TESTIMONY?

A The subject of this testimony is the planning and implementation of Advanced Metering Infrastructure ("AMI") by Hawaiian Electric Company, Inc. ("HECO"), Hawaii Electric Light Company, Inc. ("HELCO") and Maui Electric Company ("MECO"), collectively the "HECO Companies."

Q WHAT IS THE PURPOSE OF THIS TESTIMONY?

A The purpose of this testimony is to describe and recommend a framework to plan and implement AMI ("AMI Framework") in support of the goals of Hawaii Clean Energy Initiative.

Q PLEASE SUMMARIZE THE MAIN POINTS OF YOUR PROPOSED AMI FRAMEWORK FOR THE HECO COMPANIES

A They are:

- While I believe there is agreement among the Parties in this docket that implementation of Advanced Metering Infrastructure ("AMI") is generally a "good thing," HECO has not recommended or discussed a framework for the design and implementation of AMI. For example, while HECO notes that AMI can reduce metering costs and inform customers on their energy use and possible alternative ways to reduce their consumption, how and when and for how much, will HECO use AMI to achieve other benefits of Smart Grids, such as demand response ("DR"),
- The primary argument herein is that the HECO should proceed with AMI as part of its overall Integrated Resource Plan ("IRP") process (reference docket no. 2009-0108). Specifically, a well-thought out AMI Framework should be developed as part of the new IRP before proceeding with what now appears to be a separate track of initial implementation in certain markets, followed by evaluation and planning for additional activities later,

- The appropriate role of the HECO Companies with respect to the Public Benefits Fund ("PBF") Administrator need to be clarified and justified, given that the PBF Administrator (Science Applications International Corporation) is to administer energy efficiency programs and activities in the HECO Companies service areas, and
- The appropriate role for the renewable energy and energy efficiencies industry in the framework, and
- The appropriate role for government, community-based organizations, environmental groups and consumers in the framework.

Q HOW IS THIS TESTIMONY ORGANIZED?

A **Section II** presents the definition of key terms used herein.

Section III presents and discusses a framework of structured competition in the DG market in Hawaii.

Section IV presents recommendations for the next steps to implement the proposed AMI Framework.

SECTION II -- DEFINITIONS

Q PLEASE IDENTIFY AND DEFINE TERMS RELEVANT TO THIS TESTIMONY.

A The following are the relevant terms: AMI, Energy Agreement, HCEI, Smart Grid

- Advanced Metering Infrastructure ("AMI")[1] refers to systems that "measure, collect and analyze energy usage, from advanced devices such as electricity meters, gas meters, and/or water meters, through various communication media on request or on a pre-defined schedule. This infrastructure includes hardware, software, communications, customer associated systems and meter data management (MDM) software. The network between the measurement devices and business systems allows collection and distribution of information to customers, suppliers, utility companies and service providers. This enables these businesses to either participate in, or provide, demand response solutions, products and services. By providing information to customers, the system assists a change in energy usage from their normal consumption patterns, either in response to changes in price or as incentives designed to encourage lower energy usage use at times of peak-demand periods or higher wholesale prices or during periods of low operational systems reliability. AMI "raises the bar" with regard to traditional Automatic meter reading (AMR) in that it enables two-way communications with the meter. Traditional systems which were only capable of meter readings don't qualify as AMI systems."
- Hawaii Clean Energy Initiative[2]. "On January 28, 2008, the State of Hawaii and the US Department of Energy announced a memorandum of understanding and announced the Hawaii Clean Energy Initiative, which has a goal to use renewable resources such as wind, sun, ocean, geothermal, and bioenergy to supply 70 percent or more of Hawaii's energy needs by 2030 and to reduce the

state's dependence on imported oil. The Initiative's efforts will focus on working with public and private partners on several clean energy projects throughout the state including: designing cost-effective approaches for 100 percent use of renewable energy on smaller islands, designing systems to improve stability of electrical grids operating with variable generating sources, such as wind power plants on the Island of Hawaii and Maui, and expanding Hawaii's capability to

- Smart Grid refers[3] to a grid that "delivers electricity from suppliers to consumers using digital technology to save energy, reduce cost and increase reliability and transparency. Such a modernized electricity network is being promoted by many governments as a way of addressing energy independence, global warming and emergency resilience issues. *As with any heavily promoted initiative, many similar proposals have many similar names, including at least* smart electric grid, ***smart power grid, intelligent grid*** *or* ***intelligrid***, ***FutureGrid*** *and the more modern* ***intergrid*** *and* ***intragrid.***"

- Time of Use[4]. "Time of Day metering (TOD), also known as Time of Usage (TOU) or Seasonal Time of Day (SToD), metering involves dividing the day, month and year into tariff slots and with higher rates at peak load periods and low tariff rates at off-peak load periods. While this can be used to automatically control usage on the part of the customer (resulting in automatic load control), it is often simply the customers responsibility to control his own usage, or pay accordingly (voluntary load control). This also allows the utilities to plan their transmission infrastructure appropriately. "

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[1] From Wikipedia
[2] *Ibid*
[3] *Ibid*
[4] *Ibid*

'TOD metering normally splits rates into two segments, peak and off-peak, with peak typically occurring during the day (non-holiday days only), such as from 1 pm to 9 pm Monday through Friday during the summer and from 6:30 am to 12 noon and 5 pm to 9 pm during the winter. The times of peak demand/cost will vary in different markets around the world.

Large commercial users can purchase power by the hour using either forecast pricing or real time pricing. Prices range from we pay you to take it (negative) to $1000/MWh (100 cents/kWh).

Some utilities allow residential customers to pay hourly rates, such as Illinois, which uses day ahead pricing."

SECTION III – DISCUSSION OF NEEDS FOR PROPOSED OF AN AMI FRAMEWORK

Q *PLEASE DESCRIBE AND DISCUSS YOUR PROPOSAL FOR AN AMI FRAMEWORK IN HAWAII*

A My response will include first the: (1) need for and benefits of an AMI Framework in Hawaii, and (2) description and discussion of the key elements of the framework,

Need For and Benefits of an AMI Framework in Hawaii

Background. The HECO Companies, in their AMI filing, have requested approval of:

1. Approximately $65M in capital funds for their proposed AMI project,
2. Deferral of an additional $13.5M in software development costs,
3. Amortization of the deferred software development costs over a 12 year period,
4. Cost recovery of remaining book value of existing meters over a three year period,
5. Cost recovery of AMI capital costs over a seven year period,
6. Installation of AMI meters on a "first-come, first-served" basis, and offering of Time of Use rates to those customers with AMI meters,

7. Expedited Time of Use Rates for residential, small commercial and large power customers,
8. Recovery of all AMI project costs via the pending Renewable Energy Infrastructure Program ("REIP") surcharge,
9. Approval of the HECO Companies contract with Sensus Metering Systems, Inc. ("Sensus") for provision of AMI Equipment and Services, and
10. Cost recovery of all lease expenses for Sensus-owned, two-way radio frequency network infrastructure ("AMI Network").

Total implementation costs are estimated to be $98M for the proposed six year deployment period of the HECO Companies' AMI Project. Operating costs are estimate at $12M for a total 6-year program cost of $110M.

The anticipated benefits as stated by HECO as[5]:

1. "cost-effective operation benefits directly attributable to the AMI system (e.g., labor savings, meter accuracy gains, energy theft recovery), and
2. customer and system benefits derived from programs that AMI supports or provides a platform for developing (e.g., customer service, DR, distribution asset utilization and outage management), which gives customers increased flexibility and satisfaction while empowering them to make wiser energy decisions.

Assessment. I would agree that the activities as proposed by the HECO Companies has value in terms of giving the Companies a "grounding" in AMI technology by virtue of confirming that the technology can work in Hawaii in terms of realizing near term operational benefits as described above. It is not clear whether these operational benefits, by themselves, are worth the requested $110M investment.

[5] HECO AMI application, pages 6 – 7.

Thus, what is missing is a plan to identify, evaluate and implement the longer term benefits, especially those that can be accomplished as part of the large Smart Grid construct. Finally, it does not appear to be prudent to proceed much further with the proposed AMI Project until an overall plan is prepared, reviewed and approved.

Proposed Additional Benefits and a Plan. In addition to the specific operational benefits that have been identified by the HECO Companies, I proposed that following potential benefits be evaluated further for inclusion in a broad-based AMI/Smart Grid Plan, including implementation of:

1. Time-Of-Use rates for small-commercial and large power customers as a "load-shifting" measure. I believe these larger customers will be better able to adapt their demand usage patterns than residential customers;
2. Inclining Block rates for residential and possibly small-commercial customers (at their option), as an "energy-savings" measure. While the HECO Companies have proposed, I believe the block rates should be parsed into more discrete blocks and with sharper inclines. For example, up to 300 kWh/month at 10 cents/kWh for residential customers on Oahu, 15 cents/kWh for the increment from 300 to 500 kWh/month, 20 cents/kWh for the increment from 500 to 700 kWh/month, 25 cents/kWh for the increment from 700 to 1000 kWh/month, 30 cents/kWh for the increment from 1,000 to 1,500 kWh/month, and 40 cents/kWh for the increment above 1,500 kWh/month; and
3. Demand response for all customers willing to have certain portions of their load curtailed, i.e., like "Energy Scout" on steroids.

Key Elements Of The Framework

The key elements of the AMI Framework are presented and illustrated by describing the proposed roles of the: (1) HECO Companies, (2) the PBF Administrator, (3) AMI providers, (4) Renewable Energy and Energy Efficiency Providers, and (5) the Commission.

(1) The role of the **HECO Companies** would be to facilitate the implementation of AMI Project summa cum Smart Grid activities as follows:

(a) planning – in IRP, the HECO Companies will identify, evaluate and prepare a plan to integrate all elements of their proposed near-term AMI Project with the Smart Grid architecture appropriate to Hawaii in the future. The plan will specifically detail how it will support the HCEI goals. This plan should also include development of the appropriate equipment, software and system standards consistent with evolving technology and standards-making activities on the mainland and elsewhere; and

(b) implementation – the HECO Companies would proceed with implementation following approval of the plan by the Commission. The Companies would focus on implementation of the TOU and inclining block rate structure, and the demand response programs, and coordinate with the PBF Administrator on energy savings programs.

(2) The role of the **PBF Administrator** would be to participate in all phases of planning and to continue to take the lead in implementing energy savings measures. In the case of the latter, this implies that the PBF Administrator would coordinate closely with residential customers that are seeking to reduce their energy bill via the inclining block rate structure;

(3 The role of the **AMI Providers** would be provide input during the planning process and support to the HECO Companies during implementation;

(4) The role of the **Renewable Energy and Energy Efficiency Providers** would be to provide input during the planning process as to how best integrate specific technologies to accomplish load shifting and energy savings goals. During implementation, the Providers will respond to requests for proposals for specific services from the HECO Companies and the PBF Administrator; and

(5) The role of the **Commission** would be to review and approval the AMI Framework and all appropriate Framework activities moving forward. When appropriate, the Commission would provide consultant support to facilitate the planning and implementation of the Framework.

Q WHAT ARE THE RECOMMENDED NEXT STEPS LEADING TO IMPLEMENTATION OF THIS FRAMEWORK?

A WSB-Hawaii does not have all the answers, and thus is committed to participating in a collaborative effort with all the Parties within the instant docket to address these and other challenges. In that spirit, WSB-Hawaii recommends the following as the next steps:

1. All Parties work collaboratively to prepare and review a draft AMI/Smart Grid Plan. Note: this planning activity would be conducted in parallel to the planned new IRP docket, and hopefully there would be ample opportunity to feedback and feed forward information from the two processes;
2. All Parties coordinate with the HECO Companies on the AMI Project activities as approved by the Commission; and
3. All Parties seek out and share all relevant information on AMI and Smart Grid technologies and the planning and implementation activities underway other jurisdictions.

Q DO YOU HAVE ANY FINAL COMMENTS?

A AMI technology and the Smart Grid appear to be not just a "work-in-progress," a real chance for Hawaii to predict the future by inventing it. I firmly be this can be best accomplished now by taking the time develop a good plan.

Q DOES THIS CONCLUDE YOUR TESTIMONY?

A Yes

Exhibit HREA-A

RESUME
WARREN S. BOLLMEIER II

PROFESSIONAL SUMMARY

Mr. Bollmeier has 38 years of experience in solving technical, management and personnel problems. He has 32 years of experience in supervising and managing renewable energy projects and activities for government and private clients. He has extensive, detailed knowledge of and expertise in wind and solar and hybrid system technologies. He also has a working knowledge of biomass, geothermal, hydro, hydrogen, ocean and wave resources and energy conversion technologies. He has managed government-sponsored research, development and demonstration ("RD&D) projects with a variety of industry, utility and other collaborative partners. He has developed and maintained a detailed knowledge of the design and deployment of renewable energy systems for remote power, village power, distributed generation and commercial utility applications. He has extensive, detailed knowledge and experience in developing and promoting energy policy issues at utility, state and federal levels. He is also working to develop new renewable projects in Hawaii.

Mr. Bollmeier has the abilities to provide clear definition of problems and to form and work with teams to implement sound projects and activities. He has excellent communication skills and has worked with a variety of U.S. and foreign government agencies, laboratories, universities, private organizations, industry, utilities and environmental advocacy groups. He has managed numerous projects both in the U.S. and overseas.

PROFESSIONAL EXPERIENCE

Wind Project Development (1996 to present). Mr. Bollmeier (dba as WSB-Hawaii) consulted with: (i) General Electric Wind Energy (formerly Enron Wind Corporation, formerly Zond-Pacific), Tehachapi, CA, to develop two windfarms in Hawaii, one on the island of Hawaii at Kahua Ranch (10 MW) and one on Maui at Kaheawa Pastures (20 MW). This work included preparation of an environmental impact statement for the Kaheawa windfarm on state conservation land, and (ii) Hawi Renewable Development on their 10 MW windfarm at Hawi on the Big Island. He is also working with three wind turbine manufacturers to introduce their turbines to the Hawaiian market. These include Southwest Wind Power (Flagstaff, Arizona), Entegrity Wind Systems, Inc. (Boulder, CO) and Windflow Ltd. (Christchurch, New Zealand). The first two companies specialize in distributed applications, the latter in commercial windfarm applications. Mr. Bollmeier continues to look for other development opportunities in Hawaii.

Renewable Energy Study (2003). Mr. Bollmeier conducted a study of renewable energy and unconventional energy resources for the Hawaii Energy Forum, Honolulu, Hawaii[6]. The objective of this study was to develop and evaluate a working database of potential *wind, solar* and *biomass* projects and other commercial activities for the generation of electricity in Hawaii over a 30 year period, and to examine possible frameworks for evaluating the resulting economics impacts. The key outputs were the preparation of a strategy to phase in renewables into the electric utility grids, an evaluation of the potential for alternative public policy options to facilitate the implementation process, and a preliminary assessment of the overall economic impacts to the state. The key results indicate that Hawaii could reach a state wide renewable electricity fraction of over 28% by the year 2018 with the implementation of 19 wind, solar and biomass projects.

[6] For details of this study, please see: http://hawaiienergypolicy.hawaii.edu/papers/bollmeier.pdf.

Energy Policy Issues (1993 to present). Mr. Bollmeier has participated as an advisor to Hawaiian Electric Company (HECO) on their Integrated Resource Plan (IRP) since 1993 and with Maui Electric Company (MECO) on their IRP since 2004. In 1994 to 1995, he participated on a docket at the Hawaii Public Utility Commission (HPUC) investigating the role of renewables in Hawaii's utility market. In 1995, he helped form the Hawaii Renewable Energy Alliance ("HREA") to promote the increased use of renewables in Hawaii. As President of HREA since 2000, he has been working closely with State Legislators, the utility, state agencies, industry members, environmental activist groups and others to secure a renewable future for Hawaii. Mr. Bollmeier has led HREA's intervention in the numerous HPUC dockets including: (i) Competition and Restructuring (No. 96-049), (ii) Distributed Generation (No. 03-0371), (iii) Competitive bidding for new generation (No. 03-0372), (iv) Demand-side management and energy efficiency (No. 05-0069), (v) Net energy metering (No. 2006-0084), (vi) Solar Water Heating Pay As You Save Program (No. 2006-0425), (vi) Renewable Portfolio Standards (No. 2007-0008), Public Benefits Fund Administrator (No. 2007-0323), Renewable Energy Infrastructure (No. 2007-0416), and Feed-In Tariffs (2008-0273), and Decoupling (2008-0274) for the Hawaiian Electric Company and its subsidiaries. Since 1995, Mr. Bollmeier has also led HREA's lobbying activities at the Hawaii State Legislature, and played an active role in gaining support for extension of our states renewable energy tax credits and establishing Hawaii's net energy metering and renewable portfolio standard laws

Solar Policy Analysis Workshop, Honolulu, HI, 1997. Mr. Bollmeier organized, coordinated and led a workshop for USDOE/NREL and the State Energy Office on solar policy options for Hawaii. The successful workshop included discussion of the State of Hawaii's solar tax credits, green pricing programs, net energy metering and broad- based policy support initiatives.

Sustainable Home Energy Use Guide, County of Maui,1996. Mr. Bollmeier prepared a consumer-oriented guide for Maui County residents. The guide includes energy-efficiency, solar-hot water collector, photovoltaic system and small wind turbine options for home owners.

Wind/Pumped-Hydro Integration and Test, Pacific Center for High Technology Research (PICHTR), 1992 to 1994. Mr. Bollmeier managed a $550K project on the Island of Hawaii (Kahua Ranch) to demonstrate the integration of wind with pumped-hydro storage for utility application. The project included participation from the State of Hawaii Department of Business, Economic Development and Tourism (DBEDT)-Energy Division, the Hawaii Natural Energy Institute, Kahua Ranch Limited, and the Hawaii Electric Light Company.

Downhole Coaxial Heat Exchanger (DCHE) Demonstration, 1990 to 1993. Mr. Bollmeier managed a $560K, U.S.-Japan project to demonstrate the DCHE concept. The U.S. partners included PICHTR and DBEDT. The Japanese partners included the Ministry of International Trade and Industry (MITI) and Sumitomo Engineering Company. An experimental test evaluation was performed at the HGP-A geothermal site on the Island of Hawaii.

Cooperative Field Test Program, SERI, 1984 to 1989. Mr. Bollmeier managed 13 cooperative research agreements for USDOE with wind industry partners. The projects included testing of utility scale wind turbines and siting studies ($2.3M total value).

Wind Energy Conversion Systems (WECS) Technology Group, Small Wind System Program, 1982-1984. Mr. Bollmeier managed a small group of engineers and technicians that were responsible for field testing of commercial wind turbines in California. He participated in the early development of standards for wind turbines and related technologies.

Wind Energy Assessment, USDOE/Government of Yugoslavia, 1984. Mr. Bollmeier was a member of a USDOE team which assessed wind energy potential in Yugoslavia.

Wind Turbine Demonstration Project, USAID, Cape Bon, Tunisia, 1983 to 1984. Mr. Bollmeier managed a demonstration project for USAID in conjunction with the Solar Projects Office, NASA, Plumbrook, Ohio. He coordinated with the Tunis Mission Office and the Tunisian Electricity and Gas Company (STEG). The project included resource and site assessment, design, procurement, pre-commissioning tests, packaging, shipment and installation of two 10 kW wind turbines at Cape Bon, Tunisia.

Hybrid-Energy System Project, 1982 to 1983. Mr. Bollmeier managed a hybrid energy system project for the U.S. Army, Ft. Huachuca, AZ. The project included design and testing of a complete system consisting of three small wind turbines (total of 5 kW), two photovoltaic systems (total of 3 kW), a battery and control system.

System Development Group Manager, Small Wind Systems Program, 1980 to 1982. Mr. Bollmeier managed the System Development Group (three engineers and one administrative assistant) and directed 14 separate projects for new wind turbine designs ($15M total value). The project included design, fabrication, and testing of prototype units at Rocky Flats, CO.

Technical Monitor, Small Wind Systems Program, 1997 to 1980. Mr. Bollmeier managed three subcontracts ($1.7M total value) for the development of small (1 to 2 kW), high-reliability, wind turbines for remote applications. Two of these contractors subsequently commercialized wind turbines for remote and village power applications.

Project Engineer, Solid Rocket Division, Air Force Rocket Propulsion Laboratory, Edwards AFB, CA, 1974 to 1977. As an USAF Captain, Mr. Bollmeier was responsible for two RD&D projects ($3.1M total value) to develop solid rocket motors for upper stage launch vehicles. He also provided technical support to the Space Defense Vehicle and Space Shuttle Programs.

Systems Engineer, Engineering Division, Air Force Plant Representative Office, Lockheed-Georgia Company, Marietta, Georgia, 1971 to 1974. As an USAF lieutenant, Mr. Bollmeier approved production design changes to the C-5A landing gear, ground-support and personnel subsystems, and monitored Lockheed's system safety and human engineering programs.

EDUCATION

B.S., Aerospace Engineering, University of Texas-Austin, Austin, TX, 1969
M.S., Aeronautical-Mechanical Engineering, Air Force Institute of Technology, Dayton, OH, 1971
M.B.A., Management, Georgia State University, Atlanta, GA, 1973

PROFESSIONAL ORGANIZATIONS

American Society of Mechanical Engineers
American Solar Energy Society
American Wind Energy Association
Geothermal Resources Council
Hawaii Renewable Energy Alliance

TECHNICALREPORTS/PUBLICATIONS

List available upon request.

Special Awards

1983: AWEA Government Person of the Year
2003: Wind Powering America – Regional Wind Advocacy Award

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CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing HREA-T-1 Testimony upon the following parties by causing a copy(ies) hereof to be hand-delivered or mailed, postage prepaid and properly addressed to each such party, or electronically transmitted:

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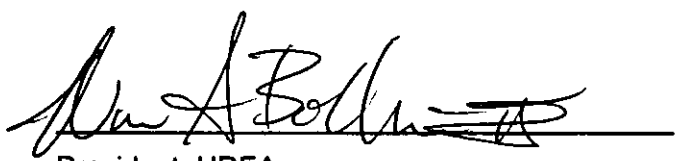

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